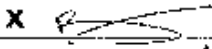
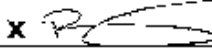
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*Sine patet veritatem. Nōll quærere nos*

# ***Developing Irregular Warfare Human Terrain Data Input for an Agent-based Model***

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Ms. Patricia Rossmaier  
Dr. Robert Sheldon**

**Operations Analysis Division (OAD)  
Marine Corps Combat Development  
Command (MCCDC)**

**76<sup>th</sup> MORSS  
WG-32**



# ***Agenda***

- **Irregular Warfare Project: Mission and Goals**
- **Scenario Background**
- **Data Acquisition**
- **How IW Data is used in our Model**
- **Pythagoras results**



# ***Irregular Warfare Project: Mission and Goals***

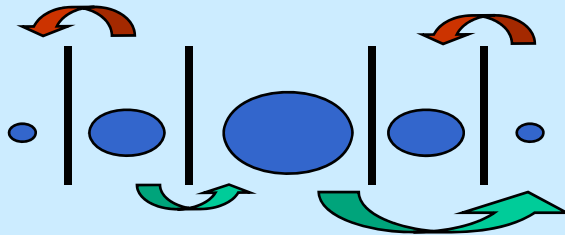
***Project Goal: Develop a prototype methodology for analyzing a USMC IW problem in-house***



# *OAD IW Project*

## *The “Khalidun Approach”*

**Conceptual Model (CM)**



**Review/Refine CM**



**The  
Khalidun  
Approach**

**Data Development**



**CM & Data Instantiation**





# Colombia Scenario



- Background
- MAGTF Mission:
  - Refugee Camp Security
  - Humanitarian Assistance / Disaster Relief
- 2 Possible Courses of Action (COAs)
  - Sea-Based
  - Shore-Based

## Provide:

Joint “Cultural” Prep of the Operational Environment  
Plausible Range of **Civilian Population Behaviors**





# Colombia

## Population Segments



- Illicit Organizations
- Catholic Church
- Police
- Military
- Displaced Persons
- Urban Poor
- Urban Middle Class
- Old Money

## Cultural Behavioral Data

- Orientation (Initial, Tendency)
- Impact Of MAGTF COAs
- Influence Of Population Segment Interactions





# ***Data Required***

## **Step 0: Define population segments**

### **Elicit data for each population segment**

- 1. Natural tendency of the population segment**
  - The population segment's narrative with respect to the insurgency
- 2. Effect of current events on population segment (impact)**
  - How the population segment reacts to a given COA
- 3. Effect of other population segments on a population segment (influence)**
  - How the population segment reacts to the narratives offered by other population segments

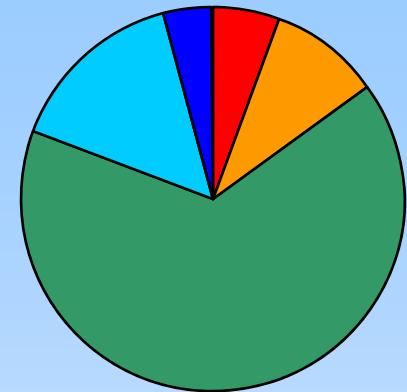


# ***SME Interviews***

- **Selecting SMEs**
  - 2 SMEs obtained via MCIA
  - SME credentials
- **Analyst & cultural SME communication challenge**
  - Analysts need numbers, e.g., probabilities, percentages
  - Cultural SMEs are non-quantitative thinkers



# Orientation Data



## Initial orientation

- “How do the actions of this population segment support the insurgency (FARC) or the Government of Colombia (GoC)?”

	FARC	Pro-FARC	Neutral	Pro-GoC	GoC
Urban Poor	5.8%	9.2%	65.7%	15.1%	4.2%

## Natural tendency of orientation

- “Given no external influences, over time, how would the actions of this population segment change to support the FARC or the GoC?”
- Captured as data for a Markov transition matrix

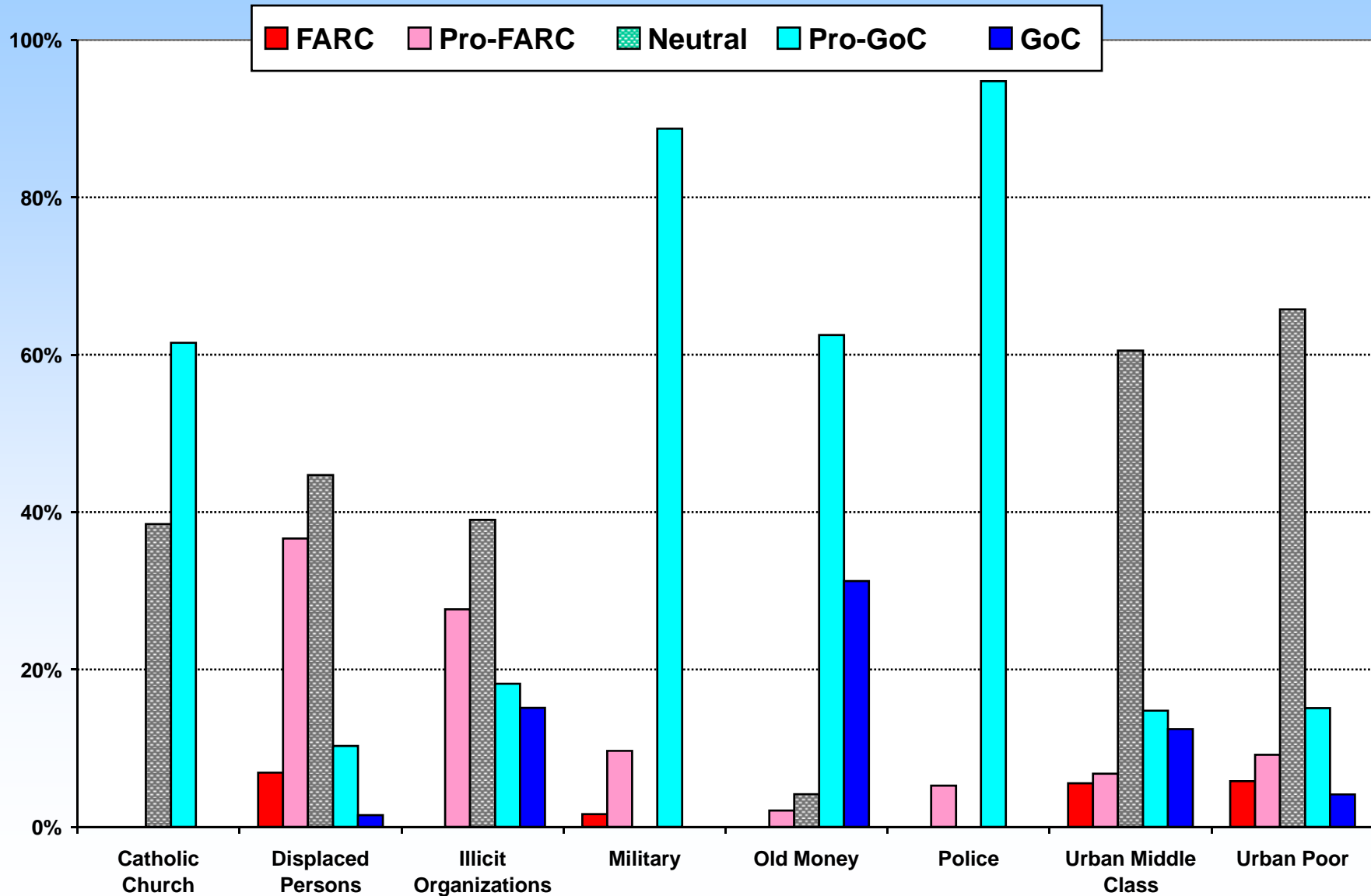


### Example: Urban Poor

	FARC	Pro-FARC	Neutral	Pro-GoC	GoC
FARC	99.4%	0.3%	0.2%	0.0%	0.0%
Pro-FARC	0.1%	98.0%	1.3%	0.5%	0.0%
Neutral	0.0%	0.4%	99.1%	0.5%	0.0%
Pro-GoC	0.0%	0.0%	1.2%	98.5%	0.3%
GoC	0.0%	0.0%	0.1%	0.1%	99.8%



# *Initial Orientation*





# *Data Elicitation*

- **Charles Osgood's Semantic Differential**

- Osgood's method is a development of the Likert Scale in that Osgood adds in three major factors or dimensions of judgment:

- EVALUATIVE (good - bad)
- POTENCY (strong - weak)
- ACTIVITY (active - passive)

} Rolled up to a single parameter  
=  $E * \sqrt{P^2 + A^2}$

- Semantic Differential is widely used in advertising and marketing research, including questionnaires, interviews and focus groups. The versatility of uses with bipolar adjectives and the simplicity of understanding them have made it ideal for consumer questionnaires and interviews.
- There are several large scale surveys done, providing data on EPA values for over 1000 different actions, emotions and people, led by David Heise, Department of Sociology, Indiana University

**Translates SME words to a quantitative measure**



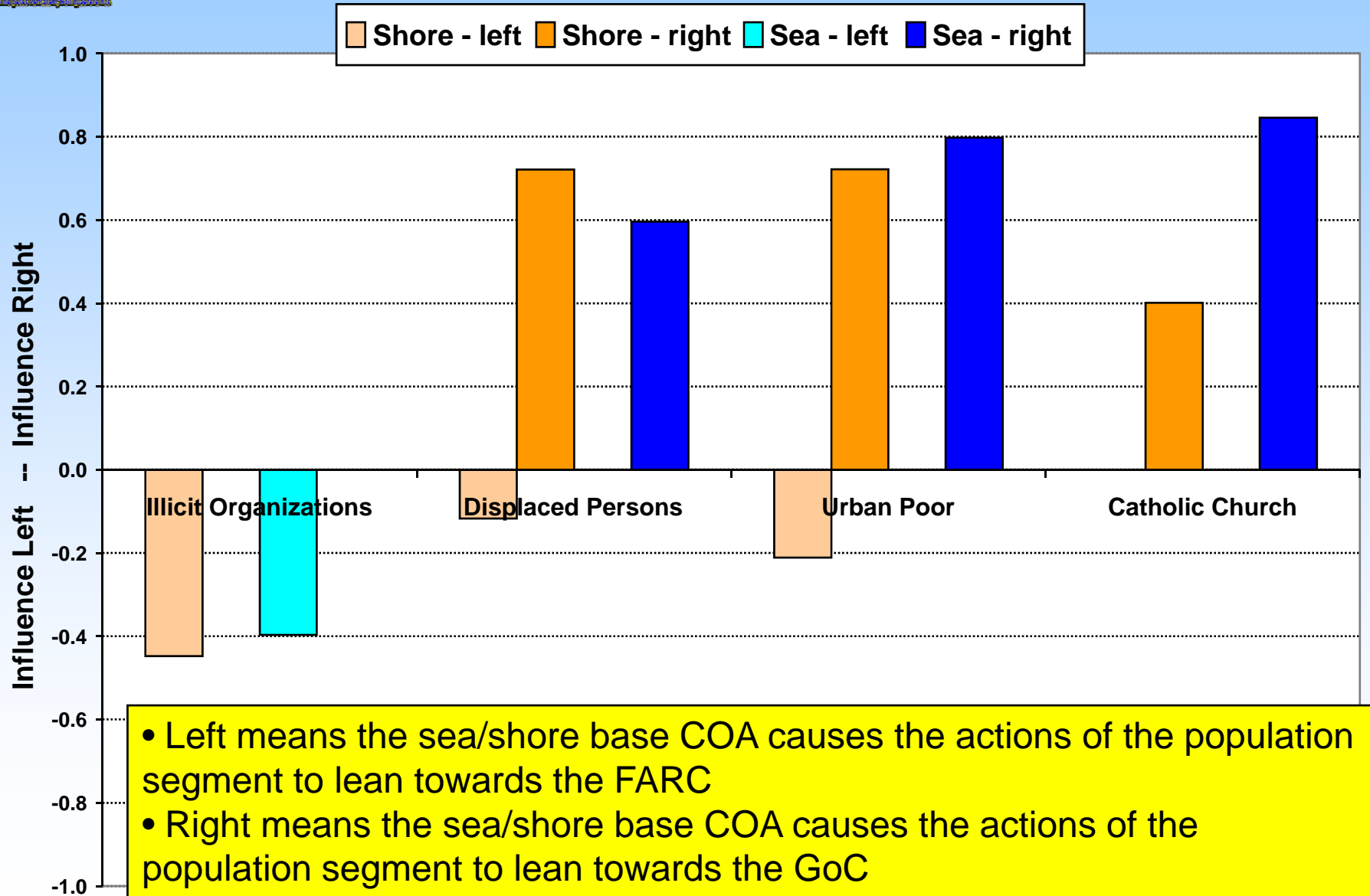
# ***Impact of COAs Elicitation***

- **“What words would this population segment use to describe MAGTF ‘sea-based’ operations?”**
  - **‘Positive words’ averaged to measure leaning more towards GoC (right)**
  - **‘Negative words’ averaged to measure leaning more towards FARC (left)**
- **“What words would this population segment use to describe MAGTF ‘shore-based’ operations?”**

Word	Impact
agree with	1.05
authorize	1.21
believe	1.62
please	2.93
appreciate	3.24



# Impact of Shore/Sea Base







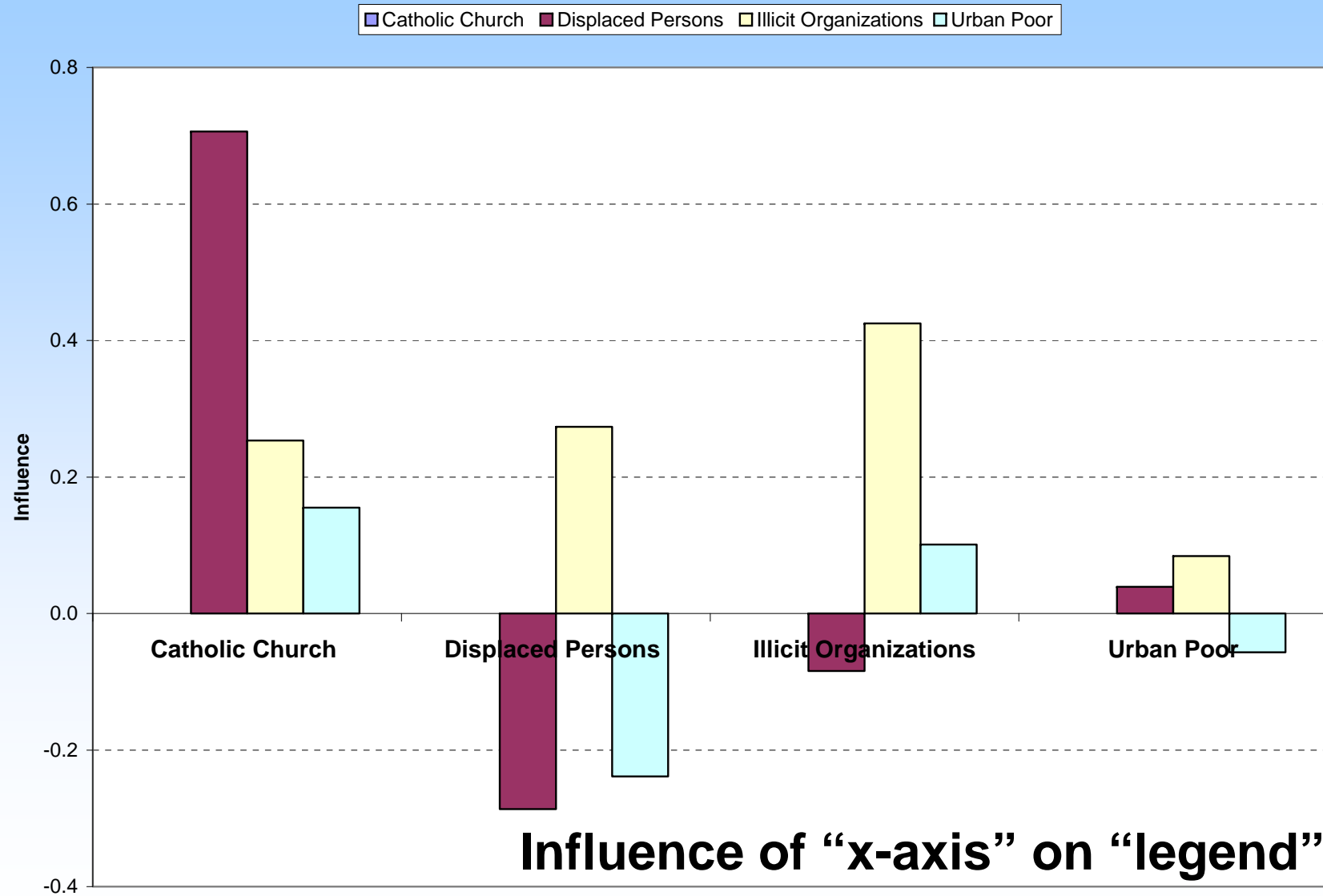
# ***Influence Elicitation***

- **Influence of other population segments**
  - “What words would this population segment use to describe another population segment?”

Word	Influence
unsuccessful	-2.41
impotent	-1.53
cowardly	-2.50
inexperienced	-2.25
mediocre	-1.47
average	-0.14



# ***Influence of other Segments***





# ***Pythagoras Results***



# Questions?





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# *Ibn Khaldun*

- **Ibn Khaldun (1332–1406)**
  - Considered the forerunner of several social scientific disciplines: demography, cultural history, historiography, the philosophy of history, sociology, and modern economics

<http://en.wikipedia.org/wiki/Khaldun>

